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CASE REPORT

Rehabilitation Nursing Intervention in Cardiac Surgery: a Case Report

Intervención de Enfermería de Rehabilitación en Cirugía Cardiaca: reporte de un caso

Maria Joana Silva[1,2], Ana Raquel Rombo[3], Sandy Severino[1], Luís Sousa[1,4,5], Nelson Guerra[1,4]

[1]Atlântica School of Health, Atlantic University, Nursing Department. Barcarena, Portugal.
[2]Instituto Português de Oncologia. Lisboa, Portugal.
[3]Unidade Local de Saúde Lisboa Ocidental, Hospital Santa Cruz. Lisboa, Portugal.
[4]RISE – Health Research Network, Porto, Portugal.
[5]Comprehensive Health Research Centre, University of Évora. Évora, Portugal.

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Corresponding author: Nelson Guerra

ABSTRACT

Introduction: the person undergoing cardiac surgery may present several postoperative complications, so the intervention of the Specialist Nurse in Rehabilitation Nursing is essential to prevent these complications, promote functional readaptation and maximize the person's abilities, enabling them to return home.
Objective: to describe the benefits of implementing a Rehabilitation Nursing program for a person undergoing cardiac surgery.
Case Report: descriptive study, case report type, written according to the CARE guidelines. A person who underwent cardiac surgery is presented, to whom an individualized rehabilitation program was implemented. The Barthel Index, Medical Research Council Muscle Scale, 6-minute Walking Test, modified Borg Scale - Assessment of Subjective Perception of Exertion were used as evaluation instruments. The rehabilitation nursing plan implemented contributed to the improvement of ventilatory pattern, muscle strength and gait. The perception of exertion decreased, allowing an increase in tolerance to activity, maximizing functionality, promoting greater independence and quality of life.
Conclusion: the results of this study demonstrate the importance of integrating rehabilitation programs in people undergoing cardiac surgery. The Rehabilitation Nurse must include in their intervention plan respiratory and motor functional re-education exercises, associated with the training of the person in this phase of health-disease transition.

Keywords: Training; Cardiac Surgery; Nursing Care; Rehabilitation Nursing.

RESUMEN

Introducción: la persona sometida a cirugía cardíaca puede presentar diversas complicaciones postoperatorias, por lo que la intervención de la Enfermera Especialista en Enfermería de Rehabilitación es esencial para prevenir estas complicaciones, promover la readaptación funcional y maximizar las capacidades de la persona, permitiéndole regresar a casa.
Objetivo: describir los beneficios de implementar un programa de Enfermería de Rehabilitación en una persona sometida a cirugía cardíaca.
Informe de caso: estudio descriptivo, tipo informe de caso, redactado según las directrices CARE. Se presenta una persona sometida a cirugía cardíaca a quien se le implementó un programa de rehabilitación

individualizado. Se utilizaron como instrumentos de evaluación el Índice de Barthel, la Escala Muscular del Consejo de Investigación Médica, la Prueba de Marcha de 6 Minutos y la Escala de Borg modificada - Evaluación de la Percepción Subjetiva del Esfuerzo. El plan de enfermería de rehabilitación implementado contribuyó a la mejora del patrón ventilatorio, la fuerza muscular y la marcha. La percepción del esfuerzo disminuyó, lo que permitió un aumento de la tolerancia a la actividad, maximizando la funcionalidad y promoviendo una mayor independencia y calidad de vida.
Conclusión: los resultados de este estudio demuestran la importancia de integrar programas de rehabilitación en personas sometidas a cirugía cardíaca. El Enfermero de Rehabilitación debe incluir en su plan de intervención ejercicios de reeducación funcional respiratoria y motora, asociados al entrenamiento de la persona en esta fase de transición salud-enfermedad.

Palabras clave: Entrenamiento; Cirugía Cardíaca; Atención de Enfermería; Enfermería de Rehabilitación.

INTRODUCTION

Cardiovascular diseases are the leading cause of death in the world. In 2021, diseases of the circulatory system remained one of the leading causes of death in Portugal.[1]

Cardiac surgery plays a fundamental role in the treatment of both congenital and acquired cardiovascular diseases. As it is a highly invasive procedure, it can lead to post-operative complications associated with physiological changes, comorbidities and worsening of previous risk factors. Aspects such as mechanical ventilation, as well as the type and duration of anesthesia, also have an impact on the length of hospital stay. Despite advances in surgical techniques and in reducing perioperative risk, there is often a significant decline in lung function soon after surgery.[2,3]

Cardiac Rehabilitation Programs are recognized as effective therapeutic resources for improving the quality of life of people with heart disease. In this context, the Rehabilitation Nurse Specialist (RNS), with the skills and knowledge formally acquired, plays a fundamental role, being the most qualified professional to provide comprehensive care for people with heart disease. The RNS's interventions aim to restore functional independence, minimize limitations resulting from the pathology or surgery, reduce the risk of complications and promote adaptation to the new health condition, optimizing health gains.[4,5] In the post-operative phase, Functional Respiratory Re-education (FRR) exercises and Functional Motor Rehabilitation (FMR) exercises are implemented. Respiratory rehabilitation is a widely recognized and implemented intervention for people undergoing heart surgery, with the aim of reducing the risk of pulmonary complications and hospitalization due to changes in lung function.[3,5] In addition, FMR is aimed at improving body balance, coordination and gait.[5]

The aim is to describe the benefits of implementing a Rehabilitation Nursing program for a person undergoing cardiac surgery, following the recommendations of the Case Report (CARE).

CASE REPORT

The 60-year-old female patient is married and lives in a house with no stairs or architectural barriers. She reports good social and family support and is currently not working. Her personal history included: dyslipidemia, obstructive sleep apnea syndrome, status post atrial tachycardia ablation. She had been followed in an arrythmology consultation since 2006, due to atrial tachycardia. In 2024, she underwent transthoracic echocardiography which revealed severe mitral regurgitation and she was referred for cardiothoracic surgery. At the consultation, she was very symptomatic, classified as New York Heart Association (NYHA) stage III-IV, reporting dyspnea and fatigue during activities of daily living. In view of this, she was proposed for cardiac surgery - mitral valve repair using an open approach. The surgery was uneventful.

The first assessment was carried out pre-surgery and at two post-surgery moments (D2 and D7 - final) using the following instruments: Barthel Index, Medical Research Council Muscle Scale (MRC), 6-minute Walk Test (6MWT) and modified Borg Scale - Subjective Perception of Effort Assessment.[6] Based on the assessment carried out, the following RNS intervention focuses were identified: Airway Cleaning; Ventilation; Muscle Movement; Activity Intolerance; Self-care; Knowledge.

The Rehabilitation Program was carried out during the hospital stay (7 days), with a total of 6 sessions, called D1 to D7. The first session took place in the Intensive Care Unit, and the others in the Cardiothoracic Service. The care plan was carried out once a day, lasting 30 minutes, respecting the person's tolerance, joint range, planes and axes. Taking into account the FITT VP acronym: frequency, intensity, time, typology, progression. It included RFR exercises (awareness and dissociation of breathing times; coughing technique with containment of the surgical wound; teaching/instruction and training on breathing technique using incentive spirometry; diaphragmatic and costal re-education) and FMR exercises (muscle-joint exercises; gait and stair training) (table 1). In the end, she presented an improvement in functionality, lower limb muscle strength, the

6-minute walk test and effort (Borg scale).

Table 1. Care plan

Nursing diagnosis	Nursing intervention
Compromised ventilation	• Assess breathing and ventilation [breathing with use of accessory muscles, respiratory effort, presence of adventitious noises] • Perform respiratory kinesitherapy: [global costal opening, selective costal opening to the left and right - 2 series/5 repetitions] • Perform breathing techniques: [control and dissociation of breathing times - 2 series/5 repetitions, abdominodiaphragmatic breathing - 5 to 10 repetitions, exhalation with semi-closed lips] • Perform positioning technique: [postural correction and rest and relaxation position] • Encourage the use of breathing devices: [Incentive Spirometry - 2 to 3 sets of 7-10 repetitions of each exercise with intermediate rest of 15 to 30 seconds between repetitions and 45 to 60 seconds between sets]. • Encourage the use of breathing techniques: [control and dissociation of breathing times, abdominodiaphragmatic breathing, deep inhalations].
Potential to improve knowledge of breathing technique	• Assess knowledge of breathing technique to optimize ventilation. • Teaching self-control of breathing pattern. • Teaching about breathing technique and positioning to optimize ventilation.
Potential to improve ability to use breathing techniques	• Assess ability to use breathing technique to optimize ventilation. • Instruct and train on breathing technique to optimize ventilation: [control and dissociation of breathing times, deep inspirations, abdominodiaphragmatic breathing, resting position].
Ineffective airway cleaning	• Assess cough reflex. • Perform breathing techniques: [control and dissociation of breathing times - 2 series/5 repetitions, abdominodiaphragmatic breathing - 5 to 10 repetitions, exhalation with half-closed lips]. • Perform respiratory kinesitherapy: [global costal opening, selective costal opening to the left and right - 2 series/5 repetitions]. • Perform positioning technique. • Encourage coughing: assisted coughing or directed coughing [with containment of the surgical wound].
Activity intolerance	• Assess activity intolerance [6-minute walk test]. • Assess Subjective Perception of Effort [Modified Borg Scale]. • Managing physical activity. • Plan physical activity [energy conservation techniques]. • Plan rest. • Monitor response to exercise.
Potential to improve knowledge of energy conservation techniques and physical exercise habits	• Assess knowledge of energy conservation techniques and physical exercise habits. • Teaching about energy conservation techniques and exercise habits.
Potential to improve capacity to use energy conservation techniques	• Assess ability to use energy conservation techniques. • Teaching energy conservation techniques. • Train in energy conservation techniques.
Decreased muscle movement	• Assess muscle strength using the [MRC] scale. • Perform active-assisted muscle and joint exercise technique for all the MS and MI segments [2 sets/5 repetitions]. • Restrictions: Shoulder flexion above 90º amplitude, shoulder abduction. • Assist active-assisted muscle and joint exercise technique for all MS and MI segments [2 series/5 repetitions]. • Encourage self-mobilization of MS and MI. • Supervise muscle movement. • Gait training [start 25-50 meters, progression: increase 10-15 meters/day]. • Up and down stairs training [start with 5 steps, progression: increase 2-3 steps/day, goal: 20 steps before discharge].

Instruments		Pre-operative assessment	D2 evaluation after surgery	Final evaluation
Functionality	Barthel Index	100/100	60/100	100/100
Muscular strength Lower limbs	MRC Scale	5/5	3/5	5/5
Activity intolerance	6-minute walk test	153 meters	144 meters	198 meters
	Modified Borg Scale	9/10	7/10	4/10

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The progression and volume were prescribed taking into account the heart rate (up to 20 beats per minute (bpm) above baseline), diastolic and systolic blood pressure (up to 20 mmHg above baseline) and the perception of effort/fatigue in Borg between 4 and 6. A 2-minute break was applied after the exercise and if Borg was above 7, the session was suspended if the level did not decrease. In the postoperative period, the person responded to the exercise and no adverse events were recorded.

DISCUSSION

The results obtained validate the fundamental role of specialized rehabilitation nursing care in the recovery of the person's functionality after heart surgery. The analysis of these results revealed improvements in the indicators assessed, namely: ventilation, airway clearance, muscle movement and activity intolerance, as well as in functionality.

These data corroborate the findings described in the representative literature[5,7,8,9,10], which show that the programs implemented by RNS in people with heart disease and undergoing cardiac surgery have positive results, namely in reducing morbidity, reducing the risk of respiratory and motor complications.

Walking ability is an important indicator of functional capacity (FC), so the 54-meter increase in the distance walked, as shown by the 6-minute walk test, reflects a significant improvement. According to the literature[5,7] walking capacity is a reliable indicator of functionality, and an increase of at least 48 meters is considered a minimum clinically relevant difference in terms of physical benefit after a rehabilitation program. The score on the Modified Borg Scale is also an indicator of improved physical condition and, consequently, of her FC[5], so it can be concluded that throughout the sessions, the person's sensation of exertion after the exercises was reduced, which is indicative of greater physical endurance.[7]

Training in respiratory rehabilitation techniques is essential to prevent possible complications associated with reduced lung volume after surgery, improve lung function, respiratory muscle strength, the ability to perform activities of daily living and relieve anxiety after surgery.[3,10]

These results refer to only one person and, despite the limitations related to the person's activity intolerance, these findings can be applied to other people, but their personal characteristics, human responses (symptom management, motivation and satisfaction), and preferences must always be taken into account in order to ensure safe, effective and person-centered care.

CONCLUSION

This case report indicates the importance of rehabilitation nursing interventions for people undergoing heart surgery, with a focus on maximizing functionality and independence. The analysis of the data reinforces the relevance of the RNS's intervention, through a personalized FRR and FMR program. The program contributed to optimizing ventilation, re-educating physical effort and minimizing the decline in functional capacity and muscle strength after surgery. The main gain was the person's ability to continue exercising at home, improving their quality of life.

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INSTITUTIONAL REVIEW BOARD STATEMENT

The study was conducted in accordance with the Declaration of Helsinki and approved by the Institutional Review Board (or Ethics Committee) of Escola Superior de Saúde Atlântica n. 39 ESSATLA 2024 (approved on December 17, 2024) for studies involving humans.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

AUTHORSHIP CONTRIBUTION

Conceptualization: Joana Silva, Luís Sousa, Sandy Severino, Nelson Guerra.
Formal analysis: Joana Silva, Ana Raquel Rombo.
Research: Joana Silva, Ana Raquel Rombo.
Drafting - original draft: Joana Silva.
Writing - proofreading and editing: Joana Silva, Ana Raquel Rombo, Luís Sousa, Sandy Severino, Nelson Guerra.